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Lubbers

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[54] **DRUM HEAD TENSIONING DEVICE**

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[51] **Int. Cl.**[4] **G10D 13/02**
[52] **U.S. Cl.** **84/413;** 84/419
[58] **Field of Search** 84/411–421

[56] **References Cited**

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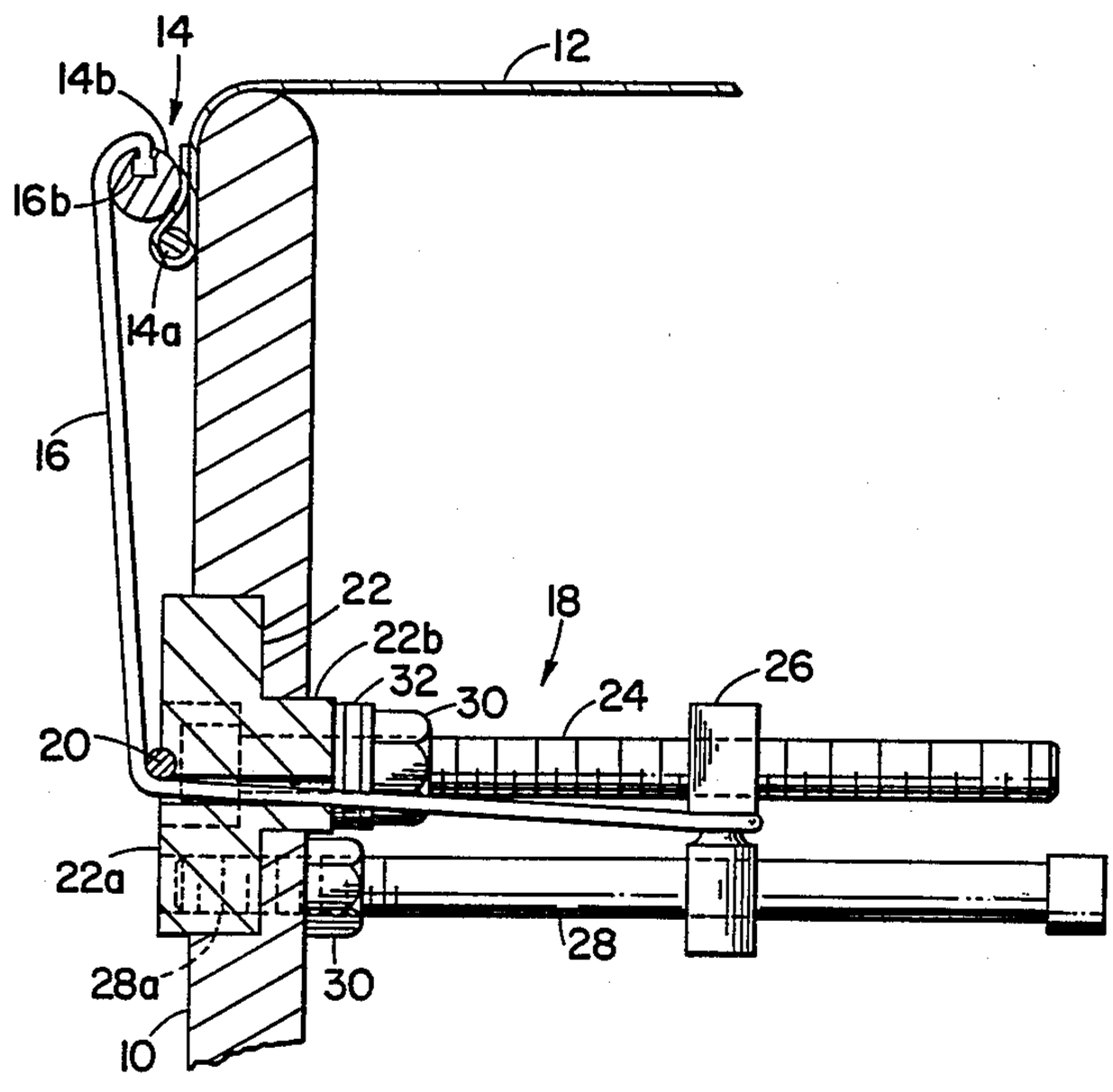
Attorney, Agent, or Firm—McCormick, Paulding & Huber

[57] **ABSTRACT**

A drum head tensioning device includes an annular fitting supporting a screw for rotation on a radial axis of the drum. A cable is connected to the conventional tension hoop and to a nut threadably received on the screw. Rotating the screw tensions the cable and hence pulls down the hoop to tension the drum head.

25 Claims, 2 Drawing Sheets



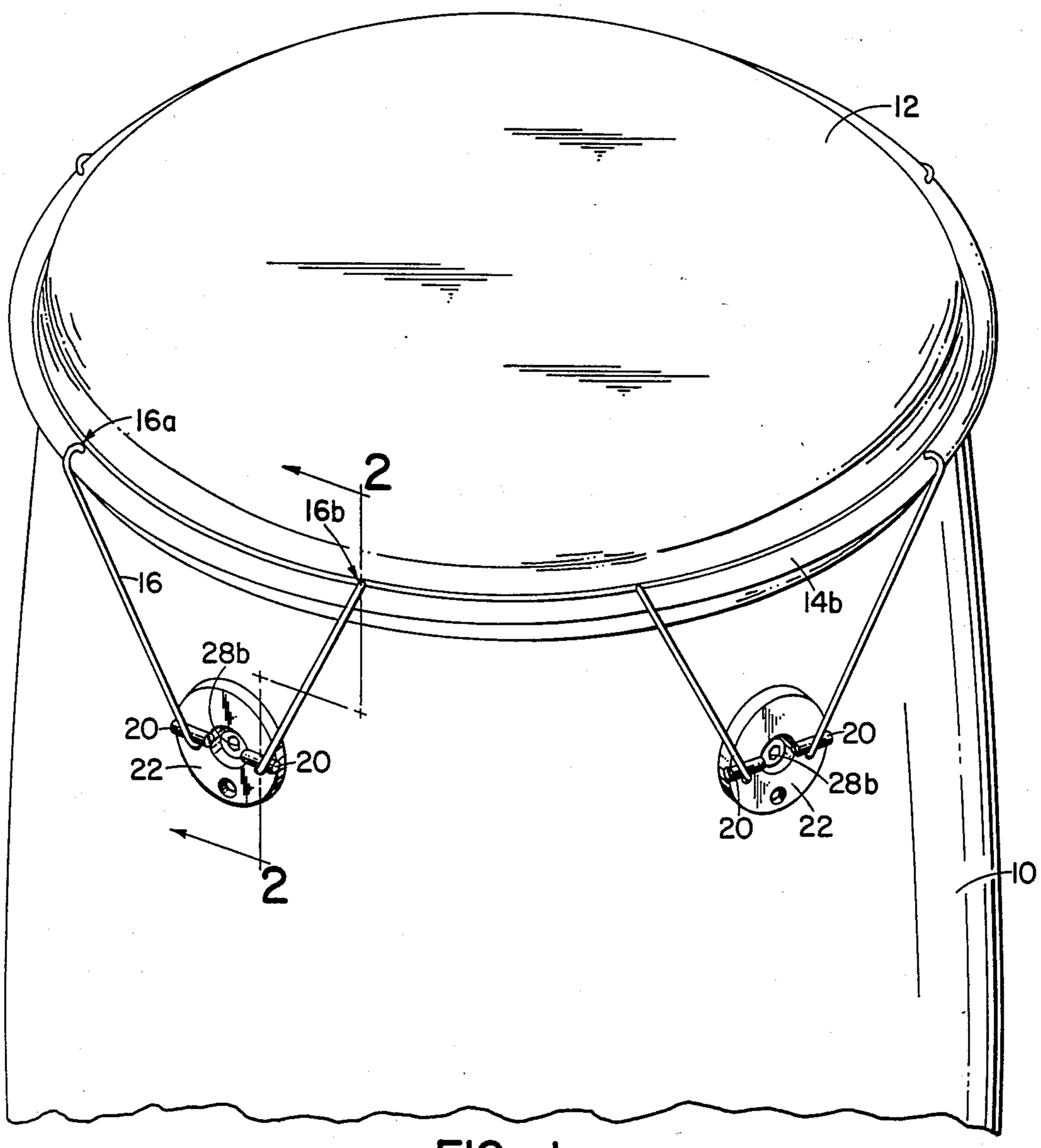


FIG. 1

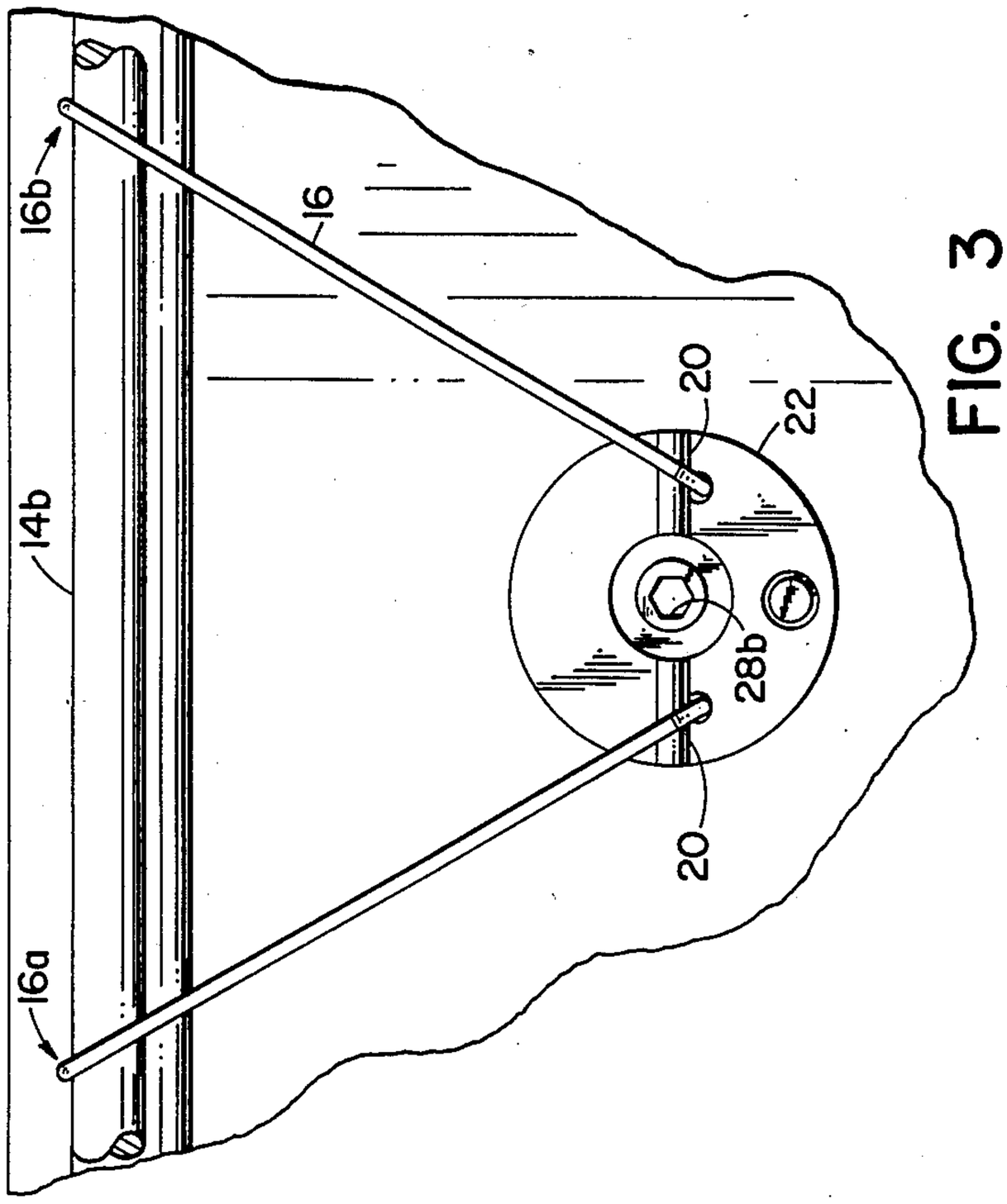

16b
16
20
22
14b
28b
20
16a

FIG. 3

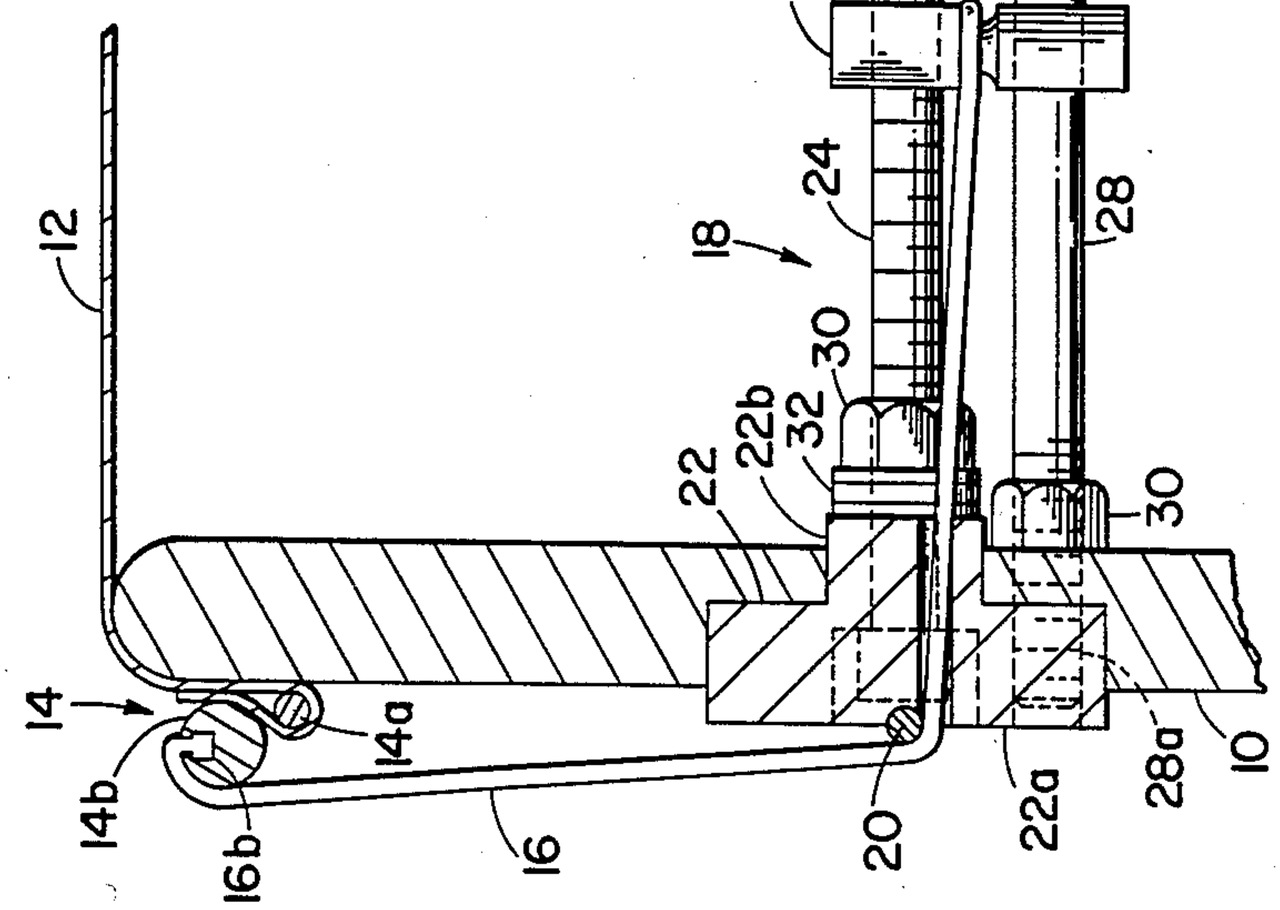

12
26
18
24
28
30
22b
32
22
30
14
14a
14b
16b
16
20
22a
28a
10

FIG. 2

DRUM HEAD TENSIONING DEVICE

This invention relates generally to percussion type musical instruments of the drum variety having a drum head stretched across at least one end of a walled sound chamber. More specifically, this invention deals with means for tensioning the drum head to vary its pitch.

In conventional drums the drum head is stretched over the rim of the cylindrical side wall defining the sound chamber of the drum and is tensioned by means of circumferentially spaced bolts extending parallel to the axis of the drum and acting on hoop means which encircles the rim and is attached to the periphery of the drum head. Tightening of the bolts pulls the hoop down around the rim and tensions the drum head. The greater the number of tensioning bolts the more evenly tension can be applied to the drum head.

One aim of the present invention is to provide a tensioning device without the cumbersome external mechanism normally required for drawing the hoop downwardly so as to achieve the desired tension in the drum head.

Another object of the invention is to provide a tensioning device that is easily adjusted by minimizing the internal friction of the moving parts.

In accordance with the present invention a plurality of fittings is provided in circumferentially spaced relationship around the axis of the head end of the walled chamber defining the shell of the drum. Each fitting is spaced below the hoop means that is conventionally provided around the head end of the drum, and a threaded screw is rotatably provided in each fitting so that the threaded screw is located entirely inside the walled sound chamber itself rather than externally on the drum.

A nut is threadably supported on each of these screw and cable means is coupled to each such nut and secured to the hoop means so that rotation of the screw causes tensioning of the cable and thereby draws the hoop downwardly to achieve the desired tension in the drum head.

The cable means comprises individual cable segments associated with each fitting, and each cable segment has its ends swaged and received in openings provided at circumferentially spaced locations in the hoop means. An intermediate portion of the cable segment passes around a midpoint of the nut and the nut also includes an opening for slidably receiving the nut on a fixed stud or post provided parallel to the screw inside the sound chamber. The fixed post so provided in the fitting serves to prevent rotation of the nut and also serves to secure the annular fitting in an opening provided for this purpose in the wall of the drum itself. Each fitting has two cable openings spaced on either side of the threaded screw, which screw is rotatably supported in the fitting on the radially extending central axis of the fitting itself.

As so constructed and arranged the cable segment has two portions or legs secured to the hoop at circumferentially spaced points and each leg angles downwardly toward the fitting where it turns approximately 90 degrees and runs generally parallel to the screw and post. The midportion of the cable segment is received by the nut.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a drum equipped with tensioning devices constructed in accordance with the present invention.

FIG. **2** is a sectional view taken generally on the line **2—2** of FIG. **1** and illustrates one such fitting in the drum of FIG. **1**.

FIG. **3** is an elevational view illustrating the fitting and associated cable segment in elevational view.

DETAILED DESCRIPTION

Turning now to the drawings in greater detail, a conventionally shaped drum shell **10** is provided with at least one end having a drum head **12** extending over the open end thereof. FIG. **2** shows in vertical section the shell side wall **10** of the generally cylindrical sound chamber together with the drum head **12** stretched across the open end thereof, and also shows hoop means **14** securing the periphery of the drum head to the cylindrical side wall **10**. The hoop means may be of conventional configuration comprising two hoops, the smaller diameter flesh hoop being indicated generally at **14***a*. The tension hoop indicated generally at **14***b* is of such size and shape that the peripheral edge of the drum head **12** is trapped therebetween as shown in FIG. **2**. This configuration for the hoop means is conventional and is commonly used in drums generally.

In accordance with the present invention cable means in the form of a cable segment **16** is provided to connect the tension hoop **14***b* of the hoop means **14** to a tensioning device indicated generally at **18** and to be described in greater detail hereinbelow.

As best shown in FIG. **1** the cable segment **16** has one swaged end secured in the tension hoop **14***b* while the opposite swaged end **16***b* of cable segment **16** is similarly secured in the same tension hoop **14***b* at a point spaced circumferentially relative to the first mentioned attachment for the one swaged cable end.

As shown best in FIG. **2** the cable **16** has its swaged ends **16***a*, **16***b* secured in upwardly open recesses provided for this purpose in the tension hoop **14***b*. The cable **16** extends downwardly from these attachment points around cable guides indicated generally at **20** which cable guides are provided in an annular fitting **22** secured in the side wall of the drum shell.

The fitting **22** is of stepped annular configuration having an outer portion of somewhat larger diameter then the inner portion. The outer portion is indicated generally at **22***a* in FIG. **2** and the inner portion at **22***b*. A central opening in the annular fitting **22** rotatably receives a threaded screw **24**, and a threaded nut **26** is received on this screw **24**. The nut **26** is prevented from rotation relative to the rotatable screw **24** by a post **28**, and the cable **16** encircles the nut **26**. The cable has leg portions that are bent around cable guides **20** and end portions **16***a* and **16***b* of these cable leg portions are attached to the hoop **14***b* as suggested in FIG. **1**. The cable guides define a bend radius for the cable leg portions at least equal to the diameter of the cable itself.

The stud or guide shaft **28** for preventing rotation of nut **26** is arranged parallel to the screw **24** and is slidably received in an opening provided for this purpose in the nut **26**. The guide shaft **28** is fixed relative to the fitting **20** and to the side wall **10** of the drum shell by means of a nut **30** secured to a threaded end portion **28***a* of the guide shaft **28** as shown. This end portion **28***a* of guide shaft **28** is also threadably received in an opening pro-

vided for this purpose in the outer annular portion 22*a* of the fitting **22**. This serves to prevent rotation of the fitting **20** within its recess in the side wall **10** of the drum shell.

The rotatable screw **24** also carries a nut **30** as shown in FIG. **2** which nut **30** serves to provide a reaction surface for a thrust bearing **32** provided between the nut **30** and the fitting **22** as shown. This thrust bearing is of conventional geometry consisting of inner and outer raceway washers together with a an intermediate retainer type washer for supporting a plurality of circumaxially spaced needle bearings. The outer or head end of screw **24** defines a tool receiving socket in the form of an allen wrench opening **28***b* as best shown in FIG. **1** and FIG. **3**. As so constructed and arranged rotation of the screw **24** can be accomplished from outside the drum itself. Turning screw **24** serves to move nut **26** in a radial direction relative to the cylindrical side wall of the drum **10** tensioning the cable **16** and causing tension hoop **14***b* to be drawn downwardly and thereby tensioning the drum head **12**. The drum head tensioning device disclosed herein provides most of the mechanism for tensioning the drum head within the confines of the sound chamber itself and avoids the necessity for providing a plurality of circumaxially spaced threaded bolts on the exterior of the drum. Furthermore, fewer tensioning devices are required since the cable **16** is arranged to form a generally equilateral triangle with the leg portions of the cable segment **16** being inclined outwardly from the fitting **22** for attachment to spaced apart points in the tension hoop **14***b*. FIG. **3** illustrates this geometry and FIG. **1** shows four such tensioning devices so arranged as to provide very close control of the tension hoop **14***b* as the musician adjusts the tension of his drum head and hence its musical pitch. The musician can even pluck at these cables to ascertain that the tension of each cable is substantially the same by simply listening to and comparing the sound made by each cable so plucked.

I claim:

1. In a percussion instrument of the type having a drum head stretched across one end of a walled sound chamber, and drum head tensioning means for varying the pitch of the instrument by axially adjusting the location of hoop means surrporting the drum head, the improvement to said tensioning means comprising:

a plurality of fittings arranged in spaced circumaxial relationship around the axis of the head end of said walled chamber, each fitting being spaced below said hoop means, each said fitting having a cable guide portion,

a threaded screw rotatably provided in each said fitting and oriented radially relative to said axis,

a nut threadably supported on each said threaded screw, and

cable means coupled to each said nut and secured to said hoop meas so that rotation of said screw causes the tension to vary in said drum head by adjusting the axial position for the hoop means, said cable means having a portion passing through said cable guide poritons.

2. The combination of claim **1** wherein said cable means comprises individual cable segments having at least one swaged end received in an opening in said hoop means, and said cable segment having a portion provided in an opening in said fitting and another portion coupled to said nut.

3. The combination of claim **2** further characterized by a guide shaft supported by said fitting and arranged parallel to said screw, said nut having an opening for slidably receiving said guide shaft, and said nut having a portion intermediate said screw and guide shaft opening coupled to said cable segment.

4. The combination of claim **2** wherein each said cable segment has an end opposite said one end, said opposite cable end also swaged to fit into another correspondingly shaped opening in said hoop means, said hoop openings for said swaged cable ends being spaced from one another, and said cable segment having an intermediate portion coupled to said nut.

5. The combination of claim **4** further characterized by a guide shaft supported by said fitting and arranged parallel to said screw, said nut having an opening for slidably receiving said guide shaft, and said nut having a portion intermediate said screw and guide shaft opening coupled to said cable segment.

6. The combination of claim **5** wherein each said fitting has two cable openings, said cable intermediate portion passing through said openings and around said nut intermediate said nut threaded opening and said nut guide shaft opening.

7. The combination of claim **6** wherein each said fitting comprises a base received in an opening provided for it in said sound chamber wall and defining a central opening for rotatably supporting said threaded screw, said screw having a head end which is accessible from outside said walled sound chamber to allow for manual rotation of said screw outside said sound chamber.

8. The combination of claim **7** further characterized by a thrust bearing on said threaded screw, said thrust bearing provided between said screw and said base to react to the tension forces in said cable segment.

9. The combination of claim **8** wherein said openings for said cable segment are spaced radially from said central opening, and wherein said cable segment has portions outside and inside said walled sound chamber, said cable portions forming substantial bend angles, and cable guides at said bends to provide a radius of curvature for said cable that is at least equal to the diameter of the cable itself.

10. The combination of claim **9** wherein said fitting base is of annular configuration with an outer annular portion of larger diameter than an inner annular portion, and said opening for said fitting base being stepped to accommodate said annular inner and outer portions, said guide shaft provided in a bore of said outer annular portion of said base that is spaced from said screw opening, and said guide shaft extending through an opening in said sound chamber wall that is spaced from the inner annular base portion whereby rotation of said annular base in said sound chamber wall is prevented.

11. The combination of claim **10** wherein said guide shaft has a threaded end, said guide shaft opening being threaded to receive said guide shaft threaded end.

12. The combination of claim **11** further characterized by a lock nut for said guide shaft threaded end.

13. The combination of claim **8** wherein said screw includes a reaction surface for said thrust brearing.

14. The combination of claim **10** wherein said screw reaction surface is defined by a threaded nut secured on said threaded screw.

15. In a percussion instrument of the type having a drum head stretched across one end of a walled sound chamber, and having drum head tensioning means for varying the pitch of the instrument by axially adjusting

the location of the hoop means supporting the drum head, the improvement to said tensioning means comprising:

a plurality of fittings arranged in spaced circumaxial relationship around the axis of the head end of said walled chamber, each fitting being spaced below said hoop means,

a threaded screw rotatably provided in each said fitting,

a guide shaft supported by said fitting and arranged parallel to said screw,

a nut threadably supported on each said threaded screw,

each said nut having an opening for slidably receiving said guide shaft,

cable segments coupled to each said nut and having one end secured to said hoop means so that rotation of said screw causes the tension to vary in said drum head by adjusting the axial position for the hoop means, and

each said nut having a portion intermediate said screw and guide shaft opening coupled to said cable segment.

16. The combination of claim **15** wherein each said cable segment has an end opposite said one end, said opposite cable end and said one end being swaged and fitting into correspondingly shaped openings in said hoop means, said hoop openings for said swaged cable ends being spaced from one another, and said cable segment having an intermediate portion coupled to said nut.

17. The combination of claim **16** wherein each said fitting has two cable openings, said cable intermediate portion passing through said openings and around said nut intermediate said nut threaded opening and said nut guide shaft opening.

18. The combination of claim **17** wherein each said fitting comprises a base received in an opening provided for it in said sound chamber wall and defining a central opening for rotatably supporting said threaded screw, said screw having a head end which is accessible from outside said walled sound chamber to allow for manual rotation of said screw outside said sound chamber.

19. The combination of claim **18** further characterized by a thrust bearing on said threaded screw, said thrust bearing provided between said screw and said base to react to the tension force in said cable segment.

20. The combination of claim **19** wherein said openings for said cable segment are spaced radially from said central opening, and wherein said cable segment has portions outside and inside said walled sound chamber, said cable portions forming substantial bend angles, said cable guide portions defining a radius of curvature for said cable that is at least equal to the diameter of the cable itself.

21. The combination of claim **20** wherein said fitting base is of annular configuration with an outer annular portion of larger diameter than an inner annular portion, and said opening for said fitting base being stepped to accommodate said annular inner and outer portions, said guide shaft provided in a bore of said outer annular poriton of said base that is spaced from said screw opening, and said guide shaft extending through an opening in said sound chamber wall that is spaced from the inner annular base portion whereby rotation of said annular base in said sound chamber wall is prevented.

22. The combination of claim **21** wherein said guide shaft has a threaded end, said guide shaft opening being threaded to receive said guide shaft threaded end.

23. The combination of claim **22** further characterized by a lock nut for said guide shaft threaded end.

24. The combination of claim **18** wherein said screw includes a reaction surface for said thrust brearing.

25. The combination of claim **24** wherein said screw reaction surface is defined by a threaded nut secured on said threaded screw.

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